

PATENT

Atty. Dkt. No. AVAN/000635US

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A [[S]] semiconductor laser comprising: an active waveguide [[3]] extending in the longitudinal [[X]], lateral [[Y]] and vertical [[Z]] directions, comprising an active region [[4]], surrounded by a filler material [[5]] and coupled to a distributed reflector [[7, 8]], characterized in that said distributed reflector [[7, 8]] is implemented in said filler material [[9]] along at least one of the lateral sides of the active region [[4]] and essentially parallel to them, in the form of at least a first configuration [[7, 8]] with a photonic band gap along said longitudinal axis [[X]].
2. (Currently Amended) The [[L]] laser ~~as claimed in~~ of claim 1, characterized in that said first configuration [[7, 8]] extends over one portion at least of the extension [[h]] of the active region [[4]] in the vertical direction [[Z]], and over one portion at least of the extension [[h]] of the filler material [[5]] in the vertical direction [[Z]].
3. (Currently Amended) The [[L]] laser ~~as claimed in one~~ of claim~~[[s]]~~ 1 ~~or~~ 2, characterized in that said first configuration [[7, 8]] is a first photonic crystal formed by localized etching of the filler material [[5]] in such a manner as to form hollow columns [[9]] there or to leave columns of material remaining there, these columns comprising a periodic grating of diffracting elements with a lattice in the horizontal plane, which lattice has dimensions of roughly the wavelength of laser operation.
4. (Currently Amended) The [[L]] laser ~~as claimed in~~ of claim 3, characterized in that said columns [[9]] extend essentially parallel to said vertical direction [[Z]] of the active region [[4]].
5. (Currently Amended) The [[L]] laser ~~as claimed in one~~ of claim~~[[s]]~~ 3 ~~or~~ 4, characterized in that said lattice of the grating of the first photonic crystal has the shape of a convex polygon,

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6. (Currently Amended) The $[[L]]$ laser ~~as claimed in~~ of claim 5, characterized in that said polygon is a regular polygon.

7. (Currently Amended) The $[[L]]$ laser ~~as claimed in one~~ of claim $[[s]]$ ~~1 to 6~~, characterized in that said first configuration $[[(7, 8)]]$ is spaced away from the lateral sides of the active region by an essentially constant distance $[[(d)]]$.

8. (Currently Amended) The $[[L]]$ laser ~~as claimed in one~~ of claim $[[s]]$ ~~1 to 6~~, characterized in that said first configuration $[[(7, 8)]]$ is spaced away from the lateral sides of the active region by a distance $[[(d1, d2)]]$ which varies along the extension $[[(L)]]$ of said active region $[[(4)]]$ in the longitudinal direction $[[(X)]]$.

9. (Currently Amended) The $[[L]]$ laser as claimed in one of claim $[[s]]$ ~~1 to 8~~, characterized in that said active waveguide comprises, on at least one of the longitudinal ends of the active region $[[(4)]]$, a filler material $[[(5)]]$ in which, at a distance δL from the first configuration $[[(7, 8)]]$, reflection means $[[(10)]]$ are formed which are implemented in the form of a second photonic band gap configuration and extending essentially parallel to the extension $[[(l)]]$ of the active region $[[(4)]]$ in the lateral direction $[[(Y)]]$.

10. (Currently Amended) The $[[L]]$ laser ~~as claimed in~~ of claim 9, characterized in that said second configuration $[[(10)]]$ extends at least over the entire extension $[[(h)]]$ of the active region $[[(4)]]$ in the vertical direction $[[(Z)]]$.

11. (Currently Amended) The $[[L]]$ laser ~~as claimed in one of~~ claim $[[s]]$ ~~9~~ or 10, characterized in that said second configuration $[[(10)]]$ extends over the entire extension $[[(l)]]$ of the active region $[[(4)]]$ in the lateral direction $[[(Y)]]$, and over one portion at least of the extension of the filler material $[[(5)]]$ in the lateral direction $[[(Y)]]$.

12. (Currently Amended) The $[[L]]$ laser ~~as claimed in one~~ of claim $[[s]]$ ~~9 to 11~~, characterized in that said second configuration $[[(10)]]$ is a second photonic crystal formed by

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localized etching of the filler material $[(5)]$ in such a manner as to form hollow columns $[(13)]$ there or to leave columns of material remaining there, these columns comprising a periodic grating of diffracting elements with a lattice in the horizontal plane, which lattice has dimensions of roughly the wavelength of laser operation.

13. (Currently Amended) The $[(L)]$ laser as claimed in of claim 12, characterized in that said columns $[(13)]$ extend essentially parallel to said vertical direction $[(Z)]$ of the active region $[(4)]$.

14. (Currently Amended) The $[(L)]$ laser as claimed in one of claim $[(s)]$ 12 ~~or 13~~, characterized in that said lattice of the grating of the second first photonic crystal has the shape of a convex polygon.

15. (Currently Amended) The $[(L)]$ laser as claimed in of claim 14, characterized in that said polygon is a regular polygon.

16. (Currently Amended) The $[(L)]$ laser as claimed in one of claim $[(s)]$ 9 ~~to 15~~, characterized in that said distance δL is essentially equal to a whole number times half the wavelength of laser operation in the filler material such that the first and second configurations $[(7, 8; 10)]$ define a Fabry-Perot type resonant cavity.